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**ECONOMIC CONDITIONS IN**

# **MONTANA**

**A REPORT TO THE GOVERNOR**

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STATE OF MONTANA  
DEPARTMENT OF COMMUNITY AFFAIRS  
RESEARCH AND INFORMATION SYSTEMS DIVISION  
1000 N. 10TH AVENUE  
HELENA, MONTANA 59611

**DECEMBER 1978**

**Department of Community Affairs  
Research and  
Information Systems Division**

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# ECONOMIC CONDITIONS IN MONTANA

A Report to the Governor

December 1978

Department of Community Affairs  
Research and Information Systems Division

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MONTANA DEPARTMENT OF COMMUNITY AFFAIRS

Capitol Station, Helena, Montana 59601

Thomas L. Judge  
Governor

The Honorable Thomas L. Judge  
Governor of Montana  
Capitol Station  
Helena, Montana 59601

Dear Governor Judge:

I am pleased to submit for your study the attached report on the state of the Montana economy.

The report includes both a general analysis of Montana's economy as well as specific discussion of some of Montana's most important economic sectors. Each industry section was written by a person with particular knowledge of the industry. The authors of the sector reports are as follows:

Richard McCommen, Montana State University, Agriculture  
Paul Polzin, University of Montana, Wholesale-Retail Trade and Services  
Maxine Johnson, University of Montana, Manufacturing  
Rick Itami, Department of Natural Resources and Conservation,  
Mining of Energy Resources  
Willis Johns, Montana Bureau of Mines and Geology, Metal Mining  
Richard Berg, Montana Bureau of Mines and Geology, Non-metallic Mining

Phillip Brooks of the DCA Research and Information Systems Division prepared the executive summary and the sections of the report dealing generally with Montana's economy.

All who have contributed to the project are hopeful that this document will be useful in formulating effective economic policy for Montana.

Sincerely,

  
Harold A. Fryslie, Director  
Department of Community Affairs

Att:



# *TABLE OF CONTENTS*

|                                                                          | Page |
|--------------------------------------------------------------------------|------|
| INTRODUCTION .....                                                       | 1    |
| FACTORS IN MONTANA'S ECONOMIC GROWTH .....                               | 3    |
| MONTANA ECONOMIC INDICATORS .....                                        | 5    |
| Labor Force .....                                                        | 5    |
| Employment .....                                                         | 6    |
| Unemployment .....                                                       | 6    |
| Income .....                                                             | 7    |
| Personal income .....                                                    | 7    |
| Per capita income .....                                                  | 8    |
| Interrelationships Among Indicators .....                                | 8    |
| ANALYSIS OF SELECTED MONTANA INDUSTRIES .....                            | 9    |
| Agriculture .....                                                        | 11   |
| Wholesale Trade, Retail Trade, and Services .....                        | 15   |
| Wholesale trade .....                                                    | 15   |
| Retail trade .....                                                       | 16   |
| Services .....                                                           | 17   |
| Manufacturing .....                                                      | 19   |
| Wood products .....                                                      | 19   |
| Primary metals .....                                                     | 22   |
| Food products .....                                                      | 22   |
| Petroleum and coal products .....                                        | 22   |
| Other manufacturing .....                                                | 23   |
| Mining of Energy Resources: Crude Petroleum, Natural Gas, and Coal ..... | 25   |
| Metal Mining .....                                                       | 29   |
| Mining of Non-metallic Minerals, Except Fuels .....                      | 31   |

# *LIST OF TABLES*

| <b>Table</b> |                                                                                                                                           | <b>Page</b> |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| 1            | MONTANA CIVILIAN LABOR FORCE, 1960-1977 .....                                                                                             | 5           |
| 2            | MONTANA CIVILIAN EMPLOYMENT, 1960-1977 .....                                                                                              | 6           |
| 3            | MONTANA AND UNITED STATES UNEMPLOYMENT, 1960-1977.....                                                                                    | 7           |
| 4            | MONTANA WHOLESALE TRADE WAGE AND SALARY EMPLOYMENT, 1960-1977.....                                                                        | 15          |
| 5            | MONTANA RETAIL TRADE WAGE AND SALARY EMPLOYMENT, 1960-1977 .....                                                                          | 16          |
| 6            | MONTANA RETAIL TRADE WAGE AND SALARY EMPLOYMENT,<br>AVERAGE HOURS WORKED PER WEEK, AND<br>AVERAGE EARNINGS PER WORKER, 1970-1977 .....    | 17          |
| 7            | MONTANA SERVICE INDUSTRY WAGE AND SALARY EMPLOYMENT<br>AVERAGE HOURS WORKED PER WEEK, AND<br>AVERAGE EARNINGS PER WORKER, 1970-1977 ..... | 18          |
| 8            | SHIPMENTS OF MANUFACTURED WOOD PRODUCTS IN MONTANA, 1976 .....                                                                            | 19          |
| 9            | MONTANA CRUDE PETROLEUM AND NATURAL GAS PRODUCTION, 1977 .....                                                                            | 26          |
| 10           | MONTANA COAL PRODUCTION, 1977.....                                                                                                        | 27          |

## *LIST OF FIGURES*

| Figure |                                                                                                                 | Page |
|--------|-----------------------------------------------------------------------------------------------------------------|------|
| 1      | MONTANA CIVILIAN LABOR FORCE, 1960-1977 .....                                                                   | 6    |
| 2      | MONTANA CIVILIAN EMPLOYMENT, 1960-1977 .....                                                                    | 6    |
| 3      | NUMBER OF UNEMPLOYED — MONTANA, 1960-1977 .....                                                                 | 6    |
| 4      | RATE OF UNEMPLOYMENT — MONTANA AND UNITED STATES, 1960-1977 .....                                               | 7    |
| 5      | MONTANA PERSONAL INCOME, 1970-1977 .....                                                                        | 7    |
| 6      | MONTANA PER CAPITA PERSONAL INCOME, 1970-1977 .....                                                             | 8    |
| 7      | MONTANA CATTLE NUMBERS, 1967-1987 .....                                                                         | 13   |
| 8      | MONTANA WHEAT PRODUCTION, 1967-1987 .....                                                                       | 13   |
| 9      | MONTANA AGRICULTURAL MARKETING RECEIPTS, 1967-1987 .....                                                        | 14   |
| 10     | U. S. HOUSING STARTS AND LUMBER AND PLYWOOD PRODUCTION<br>IN MONTANA, 1970-1977 .....                           | 20   |
| 11     | U. S. HOUSING STARTS, LUMBER AND WOOD PRODUCTS EMPLOYMENT<br>AND WAGES AND SALARIES IN MONTANA, 1970-1977 ..... | 20   |
| 12     | TIMBER HARVESTED FROM PUBLIC AND PRIVATE LANDS IN MONTANA, 1970-1977 .....                                      | 21   |



# *INTRODUCTION*

This report to the Governor contains an analysis of the past, present, and future state of Montana's economy. It should be emphasized that the report does not attempt to formulate economic policy for Montana state government. The purpose of the report is to provide information and an analysis of that data which will be useful to the decision makers responsible for economic policy. The document also was formulated to be helpful to non-policy makers who wish, in a summary manner, to learn about the Montana economy.

To accomplish the report's objectives, it is divided into three main sections: "Factors in Montana's Eco-

nomic Growth," "Montana Economic Indicators," and "Analysis of Selected Montana Industries." The first section concerning Montana's economic growth briefly describes the factors, both internal and external to the State, that help determine the economic growth of Montana. The next section on economic indicators presents and analyzes important summary measures of the growth and performance of Montana's economy. The final and most extensive section contains an analysis of some of Montana's most important industries. Each industry subsection was authored by a person with special knowledge of the particular industry being discussed.



# MONTANA ECONOMIC INDICATORS

There are a number of statistics that are useful in understanding Montana's economy and its growth. This section will concentrate on important summary indicators concerning the growth and performance of the State's economy. These are the labor force and related measures of employment and unemployment, personal income, and per capita personal income.

Employment and personal income are measures related to internal demand growth factors mentioned above. Personal income in part helps determine the demand for consumer goods and services and thus influences the growth of these industries in Montana (e.g., retail trade and services). Employment in particular sectors is related to output in those sectors. Output in specific industries influences the demand for goods and services from other sectors.

On the supply side, discussion will concentrate on Montana's labor force—a major factor in the State's growth. Data on the supply of land resources will be included later in this report in the section dealing with specific Montana industries. Information on the supply of money capital and the import and export of products into and out of Montana is not readily available.

It is useful to start the more detailed discussion of Montana's economic indicators with information about the labor force. Data on employment will be presented after the sub-section on the labor force, followed by unemployment, income, and a discussion of the interrelationships among the indicators.

## Labor Force

The labor force consists of all persons either employed or actively seeking a job. Data on Montana's labor force are summarized in Table 1 and Figure 1.

Growth in the civilian work force during the 1960s was very modest. The labor force increased by 19,100 persons or about 8 percent over the decade. However, growth during the 1970s has been substantial. During the period of 1970-1977, Montana's labor force increased by 70,000 persons or over three and one-half times the increase that occurred between 1960 and 1970. This increase does not show signs of slowing in the near future; the 1977 work force was 11,000 persons greater than that of 1976.

There are two principal factors lying behind the growth in the labor force: changes in population and changes in the percent of the population in the labor force. This latter concept is commonly called the labor force participation rate.

During the 1960s Montana's population increased by 19,000 persons. From July 1970 to July 1977, however, it increased by 63,000 persons.

From 1960 to 1970, Montana's labor force participation rate increased modestly, going from 37 percent to 39 percent. Since 1970, however, the rate has increased more substantially. In 1977, some 45 percent of Montanans were either employed or seeking a job.

Thus, while population has increased markedly during the 1970s, the labor force has increased even more because of a greater willingness of persons to participate in the work force.

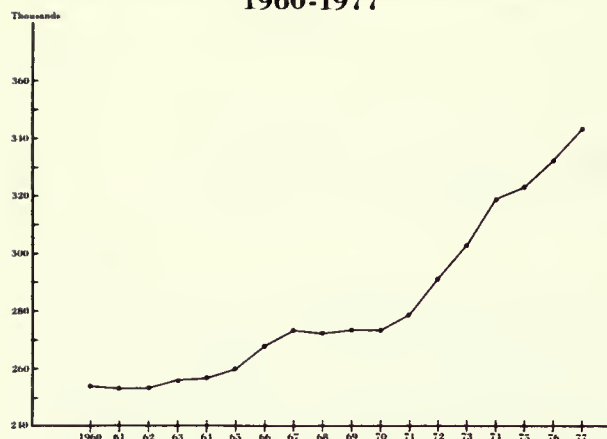
**Table 1**  
**MONTANA CIVILIAN LABOR FORCE**  
**1960-1977**

|                             |         |
|-----------------------------|---------|
| 1960                        | 253,900 |
| 1965                        | 259,700 |
| 1970                        | 273,000 |
| 1973                        | 303,200 |
| 1975                        | 322,600 |
| 1976                        | 332,000 |
| 1977                        | 343,000 |
| Percent Change<br>1960-1970 | 8       |
| Percent Change<br>1970-1977 | 26      |
| Percent Change<br>1976-1977 | 3       |

SOURCE: Montana Department of Labor and Industry, Employment Security Division, unpublished data.

Figure 1

### MONTANA CIVILIAN LABOR FORCE 1960-1977



SOURCE: Montana Department of Labor and Industry, Employment Security Division, unpublished data.

### Employment

Employment probably is the most accurately collected economic statistic for Montana. Data on total civilian employment are shown in Table 2 and Figure 2. As can be seen from Figures 1 and 2, the pattern of change in employment is similar to that which occurred for the Montana labor force. Modest growth of about eleven percent occurred during the 1960s, while rather dramatic growth transpired during the period of 1970-1977. Of the increase of nearly 60,000 jobs that occurred during the latter period, all but 3,000 were in service related industries. The same thing occurred between 1960 and 1970 in that most employment growth was in service rather than goods producing sectors. In this regard, Montana followed the national pattern of employment growth between 1960 and 1977.

Table 2

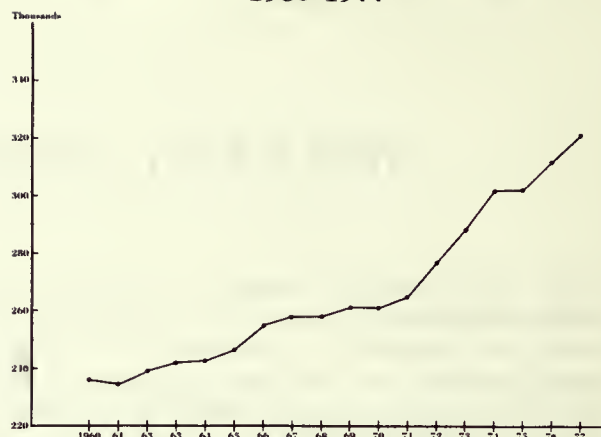
### MONTANA CIVILIAN EMPLOYMENT 1960-1977

|                             |         |
|-----------------------------|---------|
| 1960                        | 263,000 |
| 1965                        | 246,500 |
| 1970                        | 261,200 |
| 1973                        | 288,600 |
| 1975                        | 302,000 |
| 1976                        | 312,000 |
| 1977                        | 321,000 |
| Percent Change<br>1960-1970 | 11      |
| Percent Change<br>1970-1977 | 23      |
| Percent Change<br>1976-1977 | 3       |

SOURCE: Montana Department of Labor and Industry, Employment Security Division, unpublished data.

Figure 2

### MONTANA CIVILIAN EMPLOYMENT 1960-1977



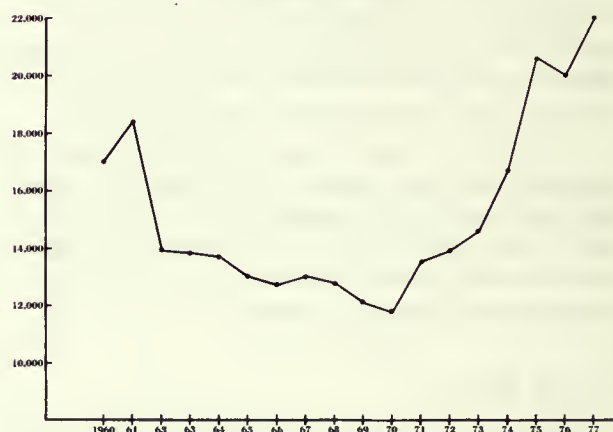
SOURCE: Montana Department of Labor and Industry, Employment Security Division, unpublished data.

### Unemployment

Unemployment is measured either in terms of the number of persons unemployed or as a rate. The number of persons unemployed in Montana is simply the difference between the total labor force and total employment. The unemployment rate is the number of unemployed persons expressed as a percent of the labor force.

Figure 3

### NUMBER OF UNEMPLOYED — MONTANA 1960-1977



SOURCE: Montana Department of Labor and Industry, Employment Security Division, unpublished data.

Data on unemployment are presented in Table 3 and Figures 3 and 4. Both the number of unemployed and the Montana unemployment rate dropped during the 1960s as a result of employment in Montana growing faster than the labor force over this period. As was mentioned above, both employment and the labor force increased at very modest rates during the 1960s. On the other hand, from 1970-1977, when both employment and the labor

<sup>1</sup>Using the standard classification scheme for industries, these sectors are: wholesale-retail trade, services, government, transportation, communications, public utilities, finance, insurance, and real estate.

**Table 3**  
**MONTANA AND UNITED STATES UNEMPLOYMENT**  
**1960-1977**

|                                | 1960   | 1965   | 1970   | 1973   | 1975   | 1976   | 1977   |
|--------------------------------|--------|--------|--------|--------|--------|--------|--------|
| Number of Unemployed — Montana | 17,000 | 13,000 | 11,800 | 14,600 | 20,600 | 20,000 | 22,000 |
| Unemployment Rate — Montana    | 6.7%   | 5.0%   | 4.3%   | 4.8%   | 6.4%   | 8.1%   | 6.4%   |
| Unemployment Rate — U.S.       | 5.6%   | 4.6%   | 4.9%   | 4.9%   | 8.5%   | 7.7%   | 7.0%   |

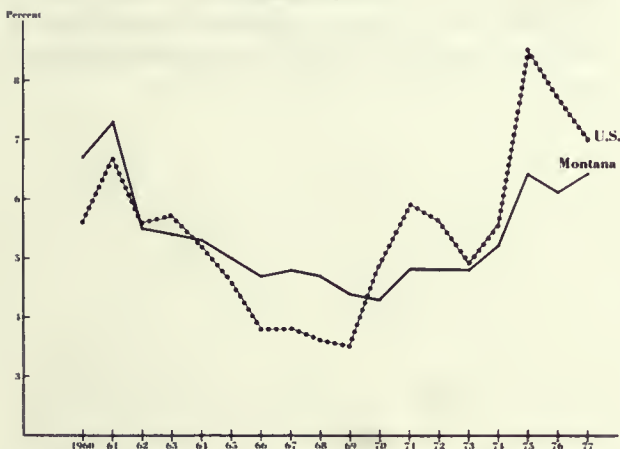
SOURCE: Montana Department of Labor and Industry, Employment Security Division, unpublished data.

force grew rapidly, employment growth did not keep pace with increases in the number of persons seeking jobs. Consequently unemployment has increased during the 1970s.

The unemployment rate is a good indicator of the ups and downs of an economy, i.e., the business cycle. When an economy is in a recession, then unemployment will be high. Unemployment will be relatively low when the economy is expanding. Figure 4, which compares unemployment rates for Montana and the U.S., illustrates how Montana's economy is partly but not entirely insulated from the national business cycle. For example, during the recent national recession of 1974-1975, Montana's unemployment rate increased substantially but not as much as happened nationally. In addition, it should be noted that the national business cycle affects Montana industries to different degrees. Agriculture is one of the sectors least sensitive to the ups and downs of the U.S. economy, while the wood products industry is one of the most sensitive.

**Figure 4**

**RATE OF UNEMPLOYMENT**  
**MONTANA & U.S.**  
**1960-1977**



SOURCE: Montana Department of Labor and Industry, Employment Security Division, unpublished data.

### Income

There are several statistics relevant to the measurement of income at the state level. The most comprehensive of these is personal income and its associated measure, per capita personal income. Total personal

income represents the total income received by persons from all sources. Per capita personal income is simply average income per person.

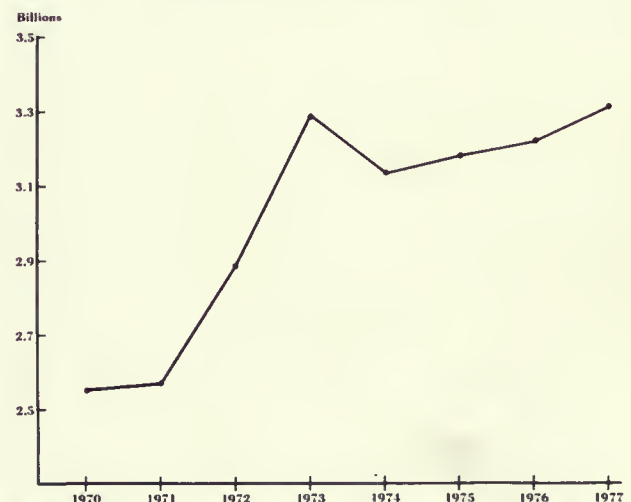
### Personal Income

Personal income tends to increase over time because of inflation, regardless of whether or not the economy is expanding. Therefore economists normally "deflate" income data using a price index in order to better judge the performance of an economy.

Montana personal income expressed in deflated or constant dollars increased between 1970 and 1977. However, as Figure 5 illustrates, the most dramatic growth occurred between 1971 and 1973, when constant dollar or real personal income increased by about twenty-eight percent. This was primarily the result of growth in agricultural income, along with increased income in Montana's industries providing services. Real personal income actually declined between 1973 and 1974 as a result of a high rate of inflation and 1974 being a more normal agricultural income year. Since 1974 real personal income has grown at a fairly steady rate.

**Figure 5**

**MONTANA PERSONAL INCOME**  
**1970-1977**  
**(Constant 1972 Dollars)**



SOURCES: Derived from unpublished data, U.S. Department of Commerce, Bureau of Economic Analysis; Bureau of Economic Analysis, *Business Statistics, 1977 Biennial Edition*; and Bureau of Economic Analysis, *Survey of Current Business*, Vol. 58, No. 8, August 1978.

### *Per Capita Income*

Per capita personal income expressed in constant dollars is frequently used as a measure of economic welfare for residents of an area. It should be emphasized that per capita income is only a partial measure of overall social welfare since the latter is also determined by less measurable factors such as environmental quality and non-income job related amenities. In addition, per capita income is only an average income figure, and therefore does not convey information on how income is distributed among segments of a society. Data on per capita income should be interpreted with these qualifications in mind.

Montana real (constant dollar) per capita personal income has generally increased historically indicating an ever higher standard of living for Montana residents over time. However, real per capita income normally has

been below the national average. For example, during the period of 1970-1977, Montana per capita income as a percent of its U.S. counterpart fluctuated around 90 percent, with the 1977 estimate being 87 percent.

The general upward trend in Montana real per capita personal income is illustrated by Figure 6 for the period of 1970-1977. A comparison of Figure 6 with Figure 5 reveals generally a similar pattern of change of per capita and total personal income. However, there are two differences. Total personal income increased slightly between 1970-1971, while per capita income declined by a small amount. Also per capita income was basically constant for the period of 1974 to 1976, while personal income increased modestly during the same period.

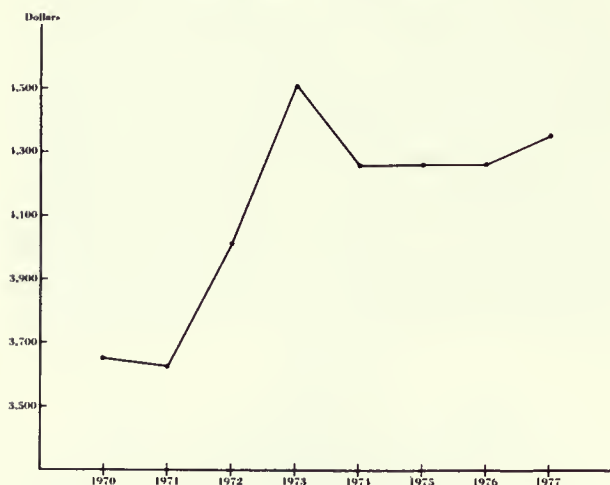
### *Interrelationships Among Indicators*

The above discussed indicators are very much inter-related. An understanding of these interrelationships is important to any analysis of Montana's economy.

In order to comprehend the nature of the interdependencies among the indicators, it is useful to analyze a case when one indicator like employment increases. Other things remaining constant, an employment increase would cause earnings to increase. Also, because of more attractive employment and labor market conditions, a higher percentage of the existing population would probably choose to be part of the labor force. In other words, labor force participation rates would go up, and the labor force would increase. However, the labor force would probably expand additionally and to a greater degree because increased employment and earnings would induce people to move into the state. The increased labor force could then induce further employment growth in particular sectors of Montana's economy, especially the retail trade and service industries. Interestingly, this entire process would then be repeated, though at a reduced level. The same set of connections could be described for a decrease in employment.

**Figure 6**

#### **MONTANA PER CAPITA PERSONAL INCOME 1970-1977 (Constant 1972 Dollars)**



SOURCES: Figure 5 and U.S. Department of Commerce, Bureau of Economic Analysis.

# *ANALYSIS OF SELECTED MONTANA INDUSTRIES*

This section discusses some of Montana's most important industries in terms of where each industry is concentrated in the State, its historical economic performance, and the determinants and potential for

growth of the industry. Each industry report was written by a person with special knowledge of the industry. The sectors included are: agriculture, wholesale-retail trade and services, manufacturing, and mining.



# AGRICULTURE

by

**Richard J. McConnen\***

**Professor and Head**

**Department of Agricultural Economics and Economics**

**Montana State University**

**Bozeman, Montana**

## *The Economics of Montana Agriculture*

The Montana Territory was urban before it became agricultural. At least Montana was urban if you consider mining camps to be urban. The initial development of Montana agriculture was in response to the high prices paid for food in mining camps and military installations. Those high prices existed because of the high cost of transporting food into Montana. As soon as transportation began to cost less and less, Montana's farmers and ranchers began to market their products more and more in non-Montana or "export" markets. That trend has continued and to understand contemporary Montana agriculture, it is necessary to understand the international markets for Montana grains, the U.S. market for Montana beef and other livestock products, and the U.S. market for specialty crops that run from cherries to sugar beets. Federal agricultural price and income policies also have had a significant direct and indirect impact on Montana agriculture for most of the past 45 years. Finally, Montana agriculture could not exist in its present form without Montana's agribusiness sector which provides the increasingly important purchased inputs which cover the gamut from agricultural credit to veterinary services and which furnishes the marketing services of such a diverse nature as country elevators and forward contracting for cattle. Obviously, the reverse also holds and Montana agribusiness could not exist without production agriculture.

Montana's agriculture is the result of a complex interaction of social, biological, economic, and political systems. No short description can tell the complete story. Most people who read this report will already have a considerable understanding of Montana agriculture. Only limited statistical information will be presented here. A great wealth of detailed statistical information about Montana agriculture is available in *Montana Agricultural Statistics* and related Montana Department of Agriculture and Statistical Reporting Service (USDA) publications. All of the many different agricultural

products are economically important to Montana and are certainly important to the individuals who produce those many products. However, rather than try to deal with all the complexities, with all of the information about many important products, in a publication meant for people who generally are fairly well informed about Montana agriculture, the rest of this section will only deal with an overview of Montana agriculture and specific references will be made to only a few major agricultural products.

During the fifteen years from 1951 until 1965, total cash receipts of Montana agriculture were between \$375 and \$472 million. During that period of time, there was considerable year to year variation in cash receipts, and the only easily recognizable economic growth was in the form of government payments. Montana's agriculture did not perform well in economic terms and, during this period of time, Montana agriculture earned and deserved the reputation of being an economically stagnant industry.

During the latter part of the 1960s things started to change. The world not only continued to need more food, but also was more able to pay for it. From 1966 until 1972, government payments continued to increase, but so did cash receipts from marketings. By 1972, cash receipts from marketing Montana agricultural products reached \$825 million, about twice the level experienced between 1961 and 1965. The "Russian Grain Deal," along with many other developments, helped Montana agriculture achieve total cash receipts in excess of \$1 billion for the first time in 1973.

Because of agriculture's reputation as an economically stagnant industry, the economic growth in Montana's agricultural sector during the late 1960s and early 1970s was often overlooked. Not only had prices increased but grain yields and production had also begun to increase to new levels. Live beef production was over

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\*The author wishes to thank Gay Holliday and Harvey Bryan for their cooperation in the development of this report.

40 percent above the levels of the 1950s. Proprietors' income from agricultural production reached a new high in 1973 and then decreased, but still stayed at levels far above earlier levels until 1977. The 60 percent drop in proprietors' income of Montana's agricultural producers between 1976 and 1977 must be recognized as among the most serious income collapses which Montana agriculture has ever experienced. Fortunately, 1978 promises to be a much better year. Despite the ups and downs, the last ten years can best be characterized as years of economic growth for Montana agriculture. Its old reputation as an economically stagnant industry has clearly become inappropriate. While many producers face cash flow problems from time to time, Montana agriculture is not only Montana's largest basic (out-of-state export) industry, it has become one of the State's most vigorous economic sectors.

Montana historically has experienced a decrease in the number of people employed in agricultural production. Modern agriculture, including Montana's agriculture, has developed as the result of substituting capital and purchased inputs for agricultural labor. Some people disapprove of these changes, but it is unlikely that this trend will be reversed. However, agricultural production is still an important source of jobs in Montana. Over 10 percent of the total employment in Montana is still to be found in agricultural production. Over 40 percent of the employment in Montana's basic industries is in agricultural production. Because the substitution of capital and purchased inputs will probably continue, exclusive use of agricultural employment to monitor the economic performance of agriculture is unwise.

Income is another useful variable for gauging the economic performance of an industry. It is helpful to evaluate a sector income statistic (like agricultural income) not only in terms of its level, but also in terms of the effect of the sector's income on other industries in specific localities. This is particularly important in the case of Montana agricultural income. While few areas of Montana's economy are immune from the impacts of a change in agricultural income, the effect can be seen most clearly when you observe what goes on in towns such as Plentywood, Lewistown, and Dillon. The impacts also occur in cities which have a more diverse economic base, such as Billings, Great Falls, and Helena, but these communities are more difficult to observe because of other unrelated, but often compensating, changes which take place in the local economy. All sectors of Montana's economy are important to the overall economy of the State. However, there is a temptation to either overlook or to downplay the economic role of Montana agriculture because of its previous reputation as a lackluster economic sector and because of the complex way it interacts with the rest of Montana's economy. Because of the economic **potential** which exists for agriculture, this could be a serious mistake.

## *The Economic Future of Montana Agriculture*

Montana agriculture is tied to U.S. agriculture which, in turn, is tied to world agriculture. Since 1973, there have been numerous studies which sought to project the future of the world's food and fiber economy. They all projected different results, but these studies agree on at least three points. First, the world demand for food will increase because of increases in both population and incomes. Second, the world has the capacity to supply the grain needs. There is some disagreement about the existence of the capacity to produce the needed livestock products for the world. Third, food production increases will be largely concentrated in countries which already have a strong commercial agricultural sector while the greatest demand growth for grain will occur in some of the rapidly developing new nations of the world. There is general agreement that Montana agriculture is part of a world wide industry that's going to grow. The question is, "How much will it grow?"

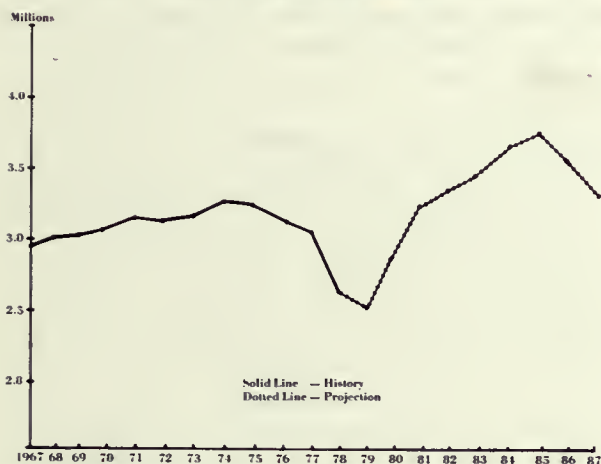
The answers developed for this report are largely based on the information from the Long-Term Agricultural Model developed by Chase Econometric Associates, Inc., a large private economic research organization. Chase Econometrics supplied this information to the State of Montana through the Old West Regional Commission. Before presenting the background material and more specific results, the reader should be reminded of at least three things. **First**, other studies come up with different specific results than those of Chase Econometrics, although the general results are largely in agreement. **Second**, the presentation of data about the future of Montana agriculture should not be interpreted in an overly precise manner. Production will vary from year to year because of weather. Prices will differ from projected prices because of market changes. Government policies here and abroad can change outcomes. Therefore, the projections should be used as indicators of general directions of change rather than as precise predictions about what will happen during a particular year. **Third**, and more importantly, the **projections represent potentials** for Montana agriculture, **not guaranteed outcomes**. These potentials for Montana agriculture can only be realized if Montana retains its competitive strength relative to agriculture in other regions of the United States. Agricultural regions and producers from all parts of the United States have many things on which they need to cooperate, but this cooperation should take place from a position of strength. If Montana's grain yields do not continue to increase, if efficiency doesn't continue to increase in the State's livestock industry, if no additional land can be irrigated, if Montana's marketing and transportation system doesn't improve, if adequate agricultural credit isn't available, and, most importantly, if the managerial capacity of Montana farmers and ranchers doesn't continue to grow, the relative

competitive strength of Montana's agriculture will decrease. If this occurs, Montana agriculture will fall short of realizing the potentials presented below.

The basic conclusions of the Chase Econometrics analysis are as follows. Real disposable income and real Gross National Product for the United States are expected to increase through 1987—the end of the projection period. Inflation is expected to slow to around 5.5-6.0 percent per year. The world economy will strengthen and world population will grow at a rate slightly under two percent per year. Foreign livestock numbers are expected to expand rapidly over the next five years. As a result, corn exports will increase nearly 60 percent to 2.35 billion bushels by 1986-87. Foreign consumption of food grains is expected to increase at the rate of 3 percent annually while foreign production will expand by only 2.8 percent. Because of this, U.S. wheat exports are expected to increase to 1.77 billion bushels by 1986-87. The cattle cycle, when coupled with increasing disposable income in the U.S., will mean an increase in cattle numbers and stronger cattle prices which may last as long as 1983. The cattle cycle generated by Chase Econometrics shows a continuation of the historic boom and bust pattern. If the U.S. cattle industry is successful in getting cattlemen to modify this cycle, the result will probably mean lower peak cattle numbers and an industry which is both more stable and more prosperous.

Figure 7

### MONTANA CATTLE NUMBERS 1967-1987 (1 January Basis)



SOURCES: Montana Department of Agriculture, and U.S. Department of Agriculture, Montana Crop and Livestock Reporting Service, *Montana Agricultural Statistics: State Series, 1867-1976*, April 1978; Montana Department of Agriculture, and U.S. Department of Agriculture, Montana Crop and Livestock Reporting Service, *Montana: Selected County Agricultural Statistics, 1976-1977*, February 1978; Projection derived.

If Montana maintains its competitive strength relative to the rest of the U.S. cattle industry, cattle numbers can be expected to follow the January 1 inventory path presented in Figure 7. If this growth is to be supported, productivity of rangeland will have to be increased, more irrigated pasture will need to be devel-

oped, more winter feed will be needed, herd management will have to be intensified, and more borrowed money capital will be used. If ranchers are to be provided with economic incentives to intensify production, a more efficient marketing system also will be needed.

Montana wheat production historically has varied considerably because of weather and government programs which restricted acreage. In the 1960s and early 1970s, the average Montana wheat crop was around 100 million bushels. Because expanded export markets will provide better marketing opportunities, and if Montana's share of the markets does not decrease, the normal level for Montana wheat production can be expected to be in excess of 200 million bushels by the 1986/87 crop year.

In order to achieve this potential wheat production level and other projected levels presented in Figure 8, several significant achievements will be required. Yield per acre will have to increase by nearly 25 percent, with at the same time more reliance on recropped land and newly broken land of lower productivity. While the agronomic challenges are substantial, the need for better management, additional agricultural credit, and an adequate transportation and marketing system must also be satisfied.

Figure 8

### MONTANA WHEAT PRODUCTION 1967-1987 (Bushels)



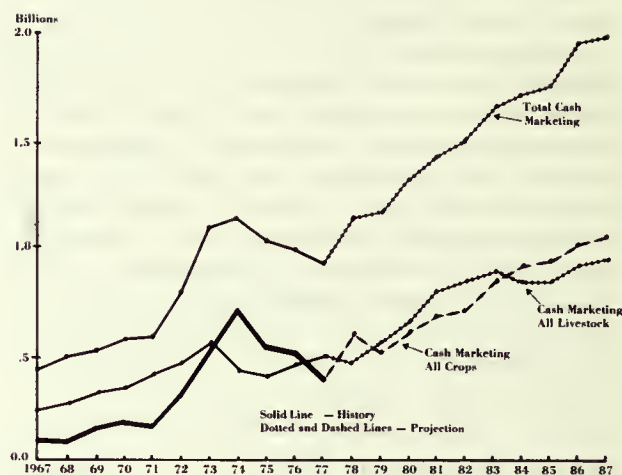
SOURCES: Montana Department of Agriculture, and U.S. Department of Agriculture, Montana Crop and Livestock Reporting Service, *Montana Agricultural Statistics: State Series, 1867-1976*, April 1978; Montana Department of Agriculture, and U.S. Department of Agriculture, Montana Crop and Livestock Reporting Service, *Montana: Selected County Agricultural Statistics, 1976-1977*, February 1978. Projection derived; all data adjusted to a marketing year basis.

The long run outlook for the U.S. feed grain industry is very favorable. However, projected barley prices do not show a significant increase relative to wheat prices until the later part of the projection period. Even then, barley yields would have to be at least 30 percent higher than wheat yields before barley would be competitive with wheat in Montana. Of course, this situation could change dramatically if new uses are found for barley. The work on barley syrup sweeteners is a particularly promising alternative for Montana grain producers.

The potential economic outlook for Montana agriculture is summarized in brief form in Figure 9. The actual outcomes will show greater variation than the projections shown as dotted and dashed lines. Two things seem apparent from Figure 9. First, the potential economic performance involves no sharp break with the patterns of past performance. Second, the potential economic performance of Montana agriculture provides a basis for optimism about the overall performance of Montana's economy. This potential exists because of the economic conditions which are expected in the rest of the United States and the world. As stated earlier, the potential can be realized only if both the private and the public sectors take appropriate enabling actions. Likewise, this kind of economic development can be prevented from occurring if both the private and the public sectors take actions which either discourage or prevent the achievement of such a potential.

The real implications of such potentials are not achievements for abstractions such as Montana agriculture and Montana's economy. The meaningful implications must be thought of in terms of farm and ranch families who have a chance for a better life. The implications also must be thought of in terms of a more viable economic base which can provide more alternatives and better services for the people of Montana.

**Figure 9**  
**MONTANA AGRICULTURAL**  
**MARKETING RECEIPTS**  
**1967-1987**  
**(Dollars)**



SOURCES: Montana Department of Agriculture, and U.S. Department of Agriculture, Montana Crop and Livestock Reporting Service, *Montana Agricultural Statistics: State Series, 1867-1976*, April 1978; Montana Department of Agriculture, and U.S. Department of Agriculture, Montana Crop and Livestock Reporting Service, *Montana Agricultural Statistics: County Statistics, 1976-1977*, Vol. 17, December 1978. Projections derived.

# WHOLESALE TRADE, RETAIL TRADE, AND SERVICES

by

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Although seldom in the limelight, wholesale trade, retail trade, and services play an important role in Montana's economy. Since 1970, these three industries provided more than one-half of the new nonagricultural wage and salary positions in the State. Taken together, they accounted for about 43 percent of the total non-farm wage and salary jobs in Montana during 1977.

## *Wholesale Trade*

Wholesale trade consists of firms primarily engaged in selling merchandise to retailers; to industrial, commercial, institutional, farm, or professional business users; or to other wholesalers. It consists of merchant wholesalers—wholesalers who take title to the goods they sell—sales branches and sales offices (but not retail stores) maintained by national companies, agents and commission brokers, petroleum bulk stations, and associations engaged in the cooperative marketing of farm products.

Most Montana wholesalers serve other firms within the State. The major exceptions are the grain companies and livestock auction markets (classified as SIC 515, farm product raw materials), which are mostly concerned with selling Montana agricultural products to out-of-state buyers; during 1977 these firms employed about 1,600 wage and salary workers, representing about 10 percent of the 15,900 total workers in wholesale trade. In terms of employment, the largest category in wholesale trade is machinery, equipment, and supplies businesses (SIC 508) with about 4,100 workers; of this total, about 1,700 worked for wholesalers of farm machinery and equipment, while the remainder marketed other industrial machinery and supplies (such as sawmill supplies, oil well machinery, and similar items). Wholesalers of groceries and related products (SIC 514) employed about 1,700 workers during 1977.

Billings is the center of wholesaling activity in Montana; in 1977, there were about 5,000 wholesale trade workers in Yellowstone County, representing more than

30 percent of the State total. Great Falls and Missoula also have significant amounts of wholesale trade employment; during 1977 there were about 2,700 workers in Cascade County and about 1,500 workers in Missoula County. Taken together, these three cities accounted for almost 60 percent of the wholesale trade wage and salary employment in Montana.

Table 4

## MONTANA WHOLESALE TRADE WAGE AND SALARY EMPLOYMENT 1960-1977

|                             |        |
|-----------------------------|--------|
| 1960                        | 8,700  |
| 1965                        | 8,800  |
| 1970                        | 9,800  |
| 1973                        | 13,100 |
| 1975                        | 14,200 |
| 1976                        | 15,100 |
| 1977                        | 15,900 |
| Percent Change<br>1960-1970 | 13     |
| Percent Change<br>1970-1977 | 62     |
| Percent Change<br>1976-1977 | 5      |

SOURCE: Montana Department of Labor and Industry, Employment Security Division, unpublished data.

The historical data presented in Table 4 shows that wage and salary employment in wholesale trade grew from 8,700 in 1960 to 9,800 in 1970, a modest increase of 13 percent. On the other hand, wage and salary employment increased by 62 percent, or 6,100 persons, between 1970 and 1977. Also, wage and salary disbursements in constant 1972 dollars rose 69 percent during the latter

period. These figures suggest that wholesale trade was one of the fastest growing industries in Montana during the 1970s. The largest increases in employment occurred during the early seventies; between 1970 and 1973 the number of wage and salary workers rose 34 percent. Growth continued after 1973, but at a lower rate.

For the most part, wholesale trade depends on economic activity within the state—that is, it is a derivative industry—and its robust performance is puzzling in light of the modest increases in Montana's basic industries during recent years. The fast and slow growing categories within wholesale trade cannot be identified and analyzed at this time, because many of the industry definitions changed in 1972 due to revisions in the Standard Industrial Classification. Further analysis must await information collected for the *1977 Census of Wholesale Trade*, which is scheduled for publication in 1979.

There is some evidence that the recent growth in wholesale trade may be due to a decentralization of this industry away from large regional trade centers, such as Minneapolis and Denver, toward smaller trade centers, such as Billings or Great Falls. There are, for example, several large companies which have recently established regional headquarters or distribution centers in Yellowstone County. Also, some Montana markets may have passed the crucial threshold which induces local companies to begin competing with the wholesalers and distributors in the distant major trade centers. To the extent that these trends continue, the outlook is for continued modest growth in wholesale trade during the next few years. In the long run, however, the future of wholesale trade will primarily depend on the overall growth of Montana's economy.

### *Retail Trade*

Retail trade includes establishments engaged in selling merchandise for personal or household consumption, or in rendering services incidental to the sale of these goods. Retail establishments are classified by kind of business according to the types of commodities sold (groceries, hardware, etc.) or the usual common trade designation (drug store, cigar store, etc.). Establishments engaged in retail trade sell merchandise to the general public; firms that sell merchandise to institutional or industrial users or exclusively for use by other businesses are classified in wholesale trade.

Caution must be exercised when analyzing retail trade because the data are incomplete. Intercensal year figures for earnings and employment cover only wage and salary workers; the self-employed (proprietors) are not included. The *1970 Census of Population* (the most current census data available) reports that about 15 percent of the total number of persons employed in retail trade were self-employed. For the most part, these proprietors reflect the numerous "ma and pa" businesses throughout Montana.

Retail trade establishments employed 50,400 wage

and salary workers during 1977. The major classifications within retail trade include eating and drinking places, with 18,300 workers, or 37 percent of the total for retail trade; general merchandise, apparel, and accessory stores, with 8,100 workers, about 16 percent of the total; automotive dealers and service stations, with 7,800 workers, approximately 15 percent of the total; and food stores, which employed 7,000 workers and accounted for approximately 14 percent of the total.

Even though trade and commerce are usually associated with cities, retail trade employment is less than fully concentrated in the State's trade centers. Montana's three largest counties (Yellowstone, Cascade, and Missoula), with approximately 33 percent of the State's population, had about 42 percent of the wage and salary employment in retail trade. This figure is an average for all retail trade establishments. Large department stores, clothing stores, and specialty shops are more concentrated in the large urban areas. On the other hand, almost every town has a bar, gas station, or grocery store and the employment in these businesses is dispersed throughout the State.

With the exception of tourist-oriented businesses, most retail trade firms serve Montanans and are classified in the derivative sector. Unfortunately, the export component of retail trade (the portion derived from sales to out-of-staters) cannot be identified with precision because both residents and nonresidents patronize restaurants, gas stations, and other establishments catering to tourists.

**Table 5**  
**MONTANA RETAIL TRADE WAGE**  
**AND SALARY EMPLOYMENT**  
**1960-1977**

|                             |        |
|-----------------------------|--------|
| 1960                        | 31,800 |
| 1965                        | 34,100 |
| 1970                        | 38,500 |
| 1973                        | 43,200 |
| 1975                        | 44,900 |
| 1976                        | 48,600 |
| 1977                        | 50,400 |
| Percent Change<br>1960-1970 | 21     |
| Percent Change<br>1970-1977 | 31     |
| Percent Change<br>1976-1977 | 4      |

SOURCE: Montana Department of Labor and Industry, Employment Security Division, unpublished data.

The historical statistics presented in Table 5 show that wage and salary employment in retail trade grew from

Table 6

**MONTANA RETAIL TRADE  
WAGE AND SALARY EMPLOYMENT,  
AVERAGE HOURS WORKED PER WEEK,  
AND AVERAGE EARNINGS PER WORKER  
1970-1977**

| Year | Wage and<br>Salary Employment | Average Hours<br>Worked per Week <sup>a</sup> | Earnings per Worker <sup>b</sup><br>(1972 dollars) |
|------|-------------------------------|-----------------------------------------------|----------------------------------------------------|
| 1970 | 38,500                        | 37.7                                          | \$4,900                                            |
| 1971 | 40,100                        | 36.0                                          | 4,700                                              |
| 1972 | 41,100                        | 35.4                                          | 5,100                                              |
| 1973 | 43,200                        | 35.7                                          | 5,100                                              |
| 1974 | 44,800                        | 35.6                                          | 5,000                                              |
| 1975 | 44,900                        | 35.4                                          | 4,700                                              |
| 1976 | 48,600                        | 35.5                                          | 4,800                                              |
| 1977 | 50,400                        | 33.2                                          | 4,800                                              |

<sup>a</sup>Includes nonsupervisory workers in wholesale and retail trade.

<sup>b</sup>Wage and salary workers only.

SOURCES: Montana Department of Labor and Industry, Employment Security Division. U.S. Bureau of Economic Analysis, Regional Economic Information System. Earnings per worker derived.

31,800 in 1960 to 38,500 by 1970, an increase of 21 percent. The growth from 38,500 in 1970 to 50,400 in 1977 represented an increase of 31 percent. These 11,900 new jobs in retail trade since 1970 comprise almost 20 percent of all the new nonagricultural wage and salary positions created in Montana during this period.

The data in Table 6 show that the increases in retail trade employment were accompanied by significant declines in average weekly hours worked. (The hours of work figures include wholesale trade, but these workers represent only a small portion of the total.) In addition, the average earnings per wage and salary worker in retail trade remained approximately stable, after correcting for inflation, between 1970 and 1977, as compared to an increase during the same period of about six percent for all wage and salary workers in Montana. Both the declines in hours worked and the lack of growth in real earnings suggest many of the new jobs in retail trade were part-time, low-paying positions. Therefore, the apparent prosperity in retail trade must be interpreted with caution.

The post-war baby crop, which began entering the labor force during the early seventies, combined with the changing attitudes of women toward working outside the home, go a long way toward explaining the rapid increases in retail trade employment. Many of the new entrants into the labor force may have been forced into accepting retail trade positions because they were young or unskilled. Further, some women may prefer part-time employment and the scheduling flexibility offered by retail trade. Stated differently, the evidence suggests

that some of the growth in retail trade employment may be attributed to increases in the supply of labor.

The growth in the labor force associated with the age structure of the population and changing female participation rates is unlikely to diminish in the next few years. Therefore, retail trade employment will probably continue to increase rapidly during 1978, 1979, and 1980, but accompanied by declines in average hours worked and relatively slow growth in real earnings per worker. By the mid 1980s, however, the post-war baby crop will be in the working ages and growth in the labor force will subside. This will reduce the unusual influences on retail trade employment and the long-run trends in this industry will parallel those of Montana's overall economy.

## Services

Services includes establishments primarily engaged in providing a wide variety of services for individuals, business and government establishments, and other organizations. Firms providing specialized services to particular industries, such as agriculture or mining, are classified in their respective divisions.

Recent trends in service industries are particularly difficult to analyze because the available data cover only wage and salary workers, and the self-employed accounted for about 20 percent of total employment during 1970. The excluded proprietors are a diverse group; they range from self-employed technicians (e.g., television repairers), to high income doctors and other professionals.

The available data show that medical and other health services are the largest category in this industry; they employed 14,900 wage and salary workers during 1977, and accounted for about 30 percent of the 49,300 jobs in all service industries. Second place belongs to hotels and other lodging places, with 6,400 workers, representing approximately 13 percent of the total. The remaining employees are scattered among the many other service categories, such as business services (3,100 workers), auto and miscellaneous repair services (2,000 workers), and recreation services (1,400 workers).

Despite the concentration of medical and other specialized services in the large cities, employment in service industries is generally spread throughout Montana. Taken together, the three largest cities (Billings, Great Falls, and Missoula) accounted for about 36 percent of the wage and salary workers, only slightly more than their 33 percent share of the State's population.

With the exception of the tourist-oriented businesses, service industries cater to local needs and are classified in the derivative sector. Even though precise statistics are not available, the export component probably accounts for only a small fraction of the firms in the service industries. Even hotels and lodging places (which are often associated with tourism) also serve many Montanans, who must travel great distances simply to conduct routine business within the State.

Total wage and salary employment in Montana's service industries grew from 33,700 workers in 1970 to

49,300 workers in 1977, a rise of over 46 percent. This growth far exceeds the average for all industries, implying that the service industries were one of the fastest growing components of Montana's economy. In fact, the 15,600 new jobs in service industries represented more than one quarter of all the new wage and salary positions created in Montana between 1970 and 1977.

Services are similar to retail trade in that the recent employment increases were accompanied by declines in the average weekly hours and relatively slow growth in real earnings per worker. As shown in Table 7, the average workweek declined from 34.8 hours in 1970 to 29.8 hours in 1977, while average earnings hovered around \$5,000 (1972 dollars) per year. These figures suggest that many of the new jobs were part-time and/or low paying positions.

Many jobs in the service industries are attractive to new labor force entrants because they require little training and have flexible work schedules. Considering the age structure of the population (that is, the large number of young people entering the working ages) and rising female participation rates, continued growth in service industry employment is likely during 1978, 1979, and 1980. In the long run, however, the current increases in the supply of labor, which can be principally attributed to demographic conditions, are likely to moderate and future trends in the service industries will be mostly determined by conditions in Montana's economy generally.

**Table 7**

**MONTANA SERVICE INDUSTRY  
WAGE AND SALARY EMPLOYMENT,  
AVERAGE HOURS WORKED PER WEEK,  
AND AVERAGE EARNINGS PER WORKER  
1970-1977**

| <b>Year</b> | <b>Wage and<br/>Salary Employment</b> | <b>Average Hours<br/>Worked per Week<sup>a</sup></b> | <b>Earnings per Worker<sup>b</sup><br/>(1972 dollars)</b> |
|-------------|---------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| 1970        | 33,700                                | 34.8                                                 | \$5,000                                                   |
| 1971        | 35,300                                | 34.6                                                 | 4,800                                                     |
| 1972        | 37,300                                | 33.5                                                 | 5,000                                                     |
| 1973        | 40,400                                | 32.1                                                 | 4,900                                                     |
| 1974        | 42,400                                | 33.3                                                 | 4,700                                                     |
| 1975        | 44,300                                | 31.0                                                 | 4,900                                                     |
| 1976        | 47,800                                | 31.1                                                 | 5,000                                                     |
| 1977        | 49,300                                | 29.8                                                 | 5,200                                                     |

<sup>a</sup>Nonsupervisory workers only.

<sup>b</sup>Wage and salary workers only.

SOURCES: Montana Department of Labor and Industry, Employment Security Division. U.S. Bureau of Economic Analysis, Regional Economic Information System. Earnings per worker derived.

# MANUFACTURING

by

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Manufacturing is not a major economic activity in Montana. Whereas approximately 25 percent of the U.S. employed labor force is typically at work in manufacturing industries, in Montana the figure is around 8 percent. The State's small population and its distance from large population centers discourage the development of manufacturing. What manufacturing activity does take place is either closely tied to Montana's natural resources or is involved in producing consumer goods for the local population. Thus, we find that the major manufacturing industries are lumber and wood products, primary metals, petroleum refining, and food products (meat packing, dairy products, grain milling, bakeries, sugar plants, and bottling firms). Most of the food products plants are locally oriented, as are other small manufacturing activities such as printing and publishing, stone, clay and glass products, and fabricated metal products.

The following pages will be devoted chiefly to lumber and wood products, the state's major manufacturing activity, with brief comments on other industries.

## Wood Products

The wood products industry is by far the most important manufacturing industry in Montana. Between 1960 and 1973 it was an expanding activity and a major contributor to economic growth in the western part of the State. In recent years it has employed from 37 to 40 percent of all manufacturing workers and contributed from 36 to 41 percent of total earnings in manufacturing industries.

The two major products of the Montana industry are lumber and plywood. In 1976, 99 sawmills shipped 1,156 million board feet of lumber valued at \$194.7 million; five plywood plants shipped 614 million square feet of  $\frac{3}{8}$  inch plywood with a value of over \$85 million (Table 8).

Table 8

### SHIPMENTS OF MANUFACTURED WOOD PRODUCTS IN MONTANA 1976

|                                                                   | Volume | Sales Value<br>(Millions of Dollars) |
|-------------------------------------------------------------------|--------|--------------------------------------|
| Lumber in millions of board feet                                  | 1,156  | \$194.7                              |
| Plywood in millions of square feet<br>( $\frac{3}{8}$ inch)       | 614    | 85.4                                 |
| Pulp and paper                                                    | D      | D                                    |
| Particleboard and fiberboard                                      | D      | D                                    |
| Posts in millions of pieces                                       | 2      | 1.8                                  |
| House logs in millions of linear feet                             | 3      | 5.3                                  |
| Structural timbers and railroad ties<br>in millions of board feet | 6      | 1.1                                  |
| All other manufactured wood products                              | —      | 7.0                                  |

SOURCE: University of Montana, Bureau of Business and Economic Research, unpublished data.

D — Withheld to prevent disclosure of data for individual firms.

Other important products include particleboard and fiberboard, posts and poles, houselogs, structural timbers, and railroad ties.

Closely related to the wood products industry is the pulp and paper industry, which is classified separately. It consists chiefly of one plant at Missoula, currently under expansion. When the new addition is completed, employment at the Missoula mill will amount to approximately 650 workers.

The wood products industry is concentrated in western Montana and especially in Missoula, Flathead, and Lincoln counties. Those three counties employed about 64 percent of all industry workers in 1977 and accounted for 71 percent of the value of total industry shipments in 1976.<sup>1</sup> Two smaller western Montana counties, Mineral and Sanders, are heavily dependent upon wood products, and several small communities are essentially one industry towns, almost totally dependent upon the local mill. Altogether, 25 Montana counties have a stake in processing forest products. In 1976, 99 sawmills, 5 plywood plants, 2 particleboard plants, 37 post and pole producers, 19 houselog plants, and 17 other wood products plants were located within their borders.<sup>2</sup>

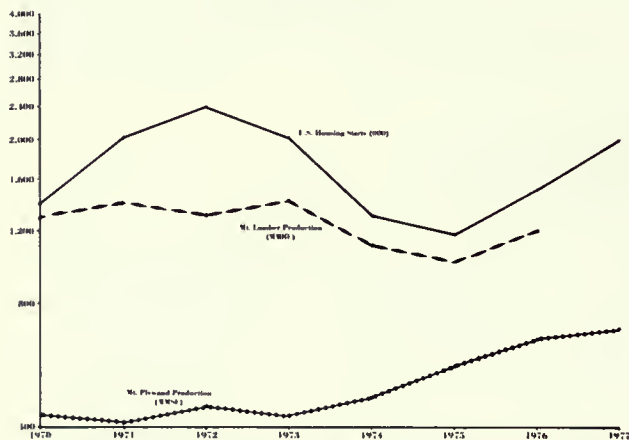
plywood production. The data are graphed on ratio (logarithm) scale so that equal slopes denote equal growth rates. Lumber production was very high in 1971, 1972, and 1973, when housing starts were at a peak. The dip in 1972 was the result of the closure of the Bonner sawmill in order that a new plywood plant could be constructed there. Production fell sharply in 1974 and 1975 as housing construction declined to a very low level. The opening of a large new plywood plant at Bonner in 1974 obscured the cyclical effects of the housing market on that industry; in the future the impact is likely to be more obvious.

Sharp fluctuations in production, of course, are reflected by changes in employment. Thus, the all-time high in employment occurred in 1973, and there was a sharp decline in employment in 1975 (Figure 11). The rapid increase in housing construction and lumber and plywood production since 1975 has resulted in a significant recovery in employment. It reached a level of 9,300 workers in 1977, and preliminary indications are that employment may have increased additionally in 1978.

A more meaningful measure of changes in the industry is possible by comparing variations in income (Figure 11). Total wages and salaries earned by industry

**Figure 10**

**U.S. HOUSING STARTS, LUMBER AND  
PLYWOOD PRODUCTION IN MONTANA  
1970-1977**  
**Ratio Scale**

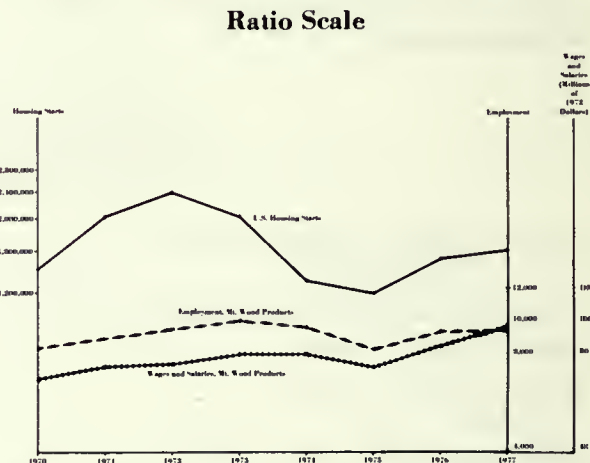


SOURCES: Housing starts — *Economic Report of the President, 1978* (Washington D.C.: U.S. Government Printing Office, 1978). Data compiled by U.S. Department of Commerce, Bureau of the Census. Lumber production — Western Wood Products Association, Statistical Department, 1976 Statistical Yearbook (Portland, Oregon, 1977). Plywood production — American Plywood Association, *Softwood Plywood Production by States* (Tacoma, Washington, 1978). Figures are in millions of square feet, 3/8 inch basis.

Although the industry has become considerably more diversified in recent years, building products (lumber, plywood, particleboard) still are its major products and its fortunes still are closely tied to the national housing market. Figure 10 illustrates the close relationship between U.S. housing starts and Montana lumber and

**Figure 11**

**U.S. HOUSING STARTS, LUMBER AND  
WOOD PRODUCTS EMPLOYMENT, AND  
WAGES AND SALARIES IN MONTANA  
1970-1977**  
**Ratio Scale**



SOURCES: Housing starts — *Economic Report of the President, 1978* (Washington D.C.: U.S. Government Printing Office, 1978). Data compiled by U.S. Department of Commerce, Bureau of the Census. Employment — Montana Department of Labor and Industry, Employment Security Division, unpublished data. Wages and salaries — U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System. Data were converted to constant 1972 dollars using the implicit price deflator for personal consumption expenditures, gross national product.

<sup>1</sup>Montana Department of Labor and Industry, Employment Security Division, unpublished data; and University of Montana, Bureau of Business and Economic Research, unpublished data.

<sup>2</sup>University of Montana, Bureau of Business and Economic Research, unpublished data.

workers, after adjustment for price changes, have grown much more rapidly than has employment. Thus, the importance of the wood products industry as a part of Montana's economic base has increased more than employment figures alone would indicate. The approximately \$133 million (current dollars) paid to industry workers in 1977 represents 42 percent of all manufacturing wages and salaries.

It should be noted that the employment and earnings figures for the lumber and wood products industry presented in Figure 11 and discussed above are not strictly comparable, either with one another or over time. The employment figures come from the Montana Department of Labor and Industry, Employment Security Division; the earnings figures, which are compiled by the U.S. Department of Commerce, Bureau of Economic Analysis, are based on a different series of employment data. In addition, the Standard Industrial Classification Code was revised in 1972. It added mobile home manufacturing to the wood products industry. The earnings figures from 1975 on are based on the 1972 SIC code and thus include the earnings of approximately 200 mobile home workers not included in earlier years. This means that part of the apparent recovery in wages and salaries of the wood products industry since 1975 really is the result of the addition of mobile home manufacturing data to figures for that industry group.

The future of the wood products industry in Montana depends mostly upon two factors: the national housing market and the local supply of timber.

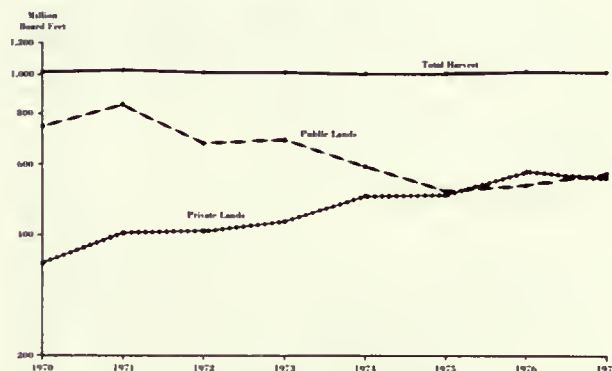
Potential demand for new housing should be strong over the next decade. New household formations will continue to be high, reflecting the large numbers of young adults born in the years after World War II. Actual spending for new housing, of course, will depend upon such factors as price, affordability, availability of mortgage funds, and investment aspects of homeownership.

Housing starts amounted to almost 2 million in 1977 and will be about the same number in 1978. Projections for 1979 are in the 1.5-1.6 million range; the 1979 level being lower than 1977 and 1978 because of anticipated higher interest rates. The outlook for 1980 is somewhat more optimistic with projected housing starts of 1.7-1.8 million units. This decline in housing starts probably will be reflected in lower levels of employment and earnings in Montana's wood products industry in 1979 and 1980. However, the industry decreases likely will not be as severe as those which occurred in 1975.

Over the longer run, developments in Montana's forest industries are heavily dependent upon what happens to the supply of public timber. As recently as 1970 and 1971, approximately two-thirds of the total timber harvest in Montana came from public lands, mostly from the national forests. In recent years, the proportion has declined to about one-half (Figure 12). Nearly all the decline occurred in the national forests. Between 1971 and 1975, the amount of timber harvested in the na-

tional forests in Montana fell by 40 percent. Small increases occurred in 1976 and 1977, but the 1977 harvest still was 33 percent below 1971.

**Figure 12**  
**TIMBER HARVESTED FROM**  
**PUBLIC AND PRIVATE LANDS IN MONTANA**  
**1970-1977**  
**Ratio Scale**



SOURCE: U.S. Forest Service, Region 1, unpublished data (Missoula, Montana).

NOTE: Public lands include federal lands administered by the Forest Service and Bureau of Land Management; Indian forestlands managed by the Bureau of Indian Affairs; and state forestlands managed by the Montana Department of Natural Resources, Division of Forestry.

The total timber harvest has been maintained by a substantial increase in the harvest on private lands. Most of the private timber land, however, is owned by a few large firms. Many other producers are wholly dependent upon public timber.

The great concern of the industry is that further reductions in the supply of public timber may occur. At the present time, some 6.5 million acres of national forest lands and grasslands are currently under review for possible designations as wilderness areas, mostly under a process called RARE II. RARE II stands for Roadless Area Review and Evaluation, and it has become a well-known acronym in Montana in recent months. At year's end 1978, the Forest Service will make recommendations as to the disposition of RARE lands. The available timber supply may be further and permanently reduced as a result.

Other national policies also concern the industry. The National Forest Management Act of 1976 directs the Forest Service to identify lands "which are not suited for timber production, considering physical, economic, and other pertinent factors . . ." This may pose a further threat to the timber supply in Montana, on the grounds that Montana's steep mountainsides are not physically suited to timber harvest and/or that they are marginal producers compared to forests in other parts of the country. In other words, investment in national forests presumably is to be allocated to areas where the relative effects on environmental quality are the smallest and the potential return on investment is the highest. Thus, the

burden may be on the Montana industry to establish the suitability of Montana national forests for timber harvest.

Understandably, these national policy developments make the industry very nervous. At best, the longer-term outlook is for stronger competition and increasing prices for what may be a declining amount of public timber. By 1985, there probably will be fewer wood products firms in Montana, with production concentrated in the operations of companies producing a combination of products utilizing both sawtimber and residuals. Employment is not likely to increase, and it may decline. Increased productivity, however, could maintain or increase total earnings of industry workers, thus sustaining the wood products industry's contribution to total income in the State.

### *Primary Metals*

The primary metals industry consists principally of two copper processing plants (one at Anaconda and one in Great Falls), an aluminum plant at Columbia Falls, and a lead processing plant in East Helena. An additional copper smelter in Anaconda (the Arbiter plant) closed in early 1978.

Employment in primary metals (smelting and refining), averaging 3,200 in 1977 and about the same during the first seven months of 1978, has fallen well below the 1970 level of 4,700. The decline has occurred mostly in copper smelting; employment at the Columbia Falls aluminum plant and at the East Helena lead processing plant are approximately the same as they were in 1970. Despite the drop in total employment, however, earnings in the industry in 1977 were about the same as in 1970, after adjustment for inflation. They accounted for 16 percent of total manufacturing wages and salaries.

Little change in primary metals employment is anticipated during the next year or two. The outlook for the longer run is less certain. If copper prices increase to the 80 cents to 1 dollar per pound range as indicated in the mining section of this report, then employment in Montana's copper processing plants should increase. On the other hand, production and employment at the Columbia Falls aluminum plant is dependent on the continued availability of large quantities of electric power.

### *Food Products*

The food products industry in Montana is a conglomeration of small plants engaged in processing Montana agricultural products, principally for local consumption. It consists mostly of meat packing plants, flour mills and animal feed mills, sugar plants, dairies, bakeries, and soft drink bottling firms.

Because of the abundance of agricultural products raised in Montana, food products is an industry group which seems to offer some opportunity for expansion.

However, employment in the industry has not expanded. In fact, employment has declined for the most part since 1973. Also, earnings have been erratic; in 1977, wages and salaries were 7 percent higher than in 1970, after adjustment for price changes.

The largest employer in the group in 1977 was meat packing, with almost 1,000 workers; in 1976 the figure was just over 600.<sup>3</sup> Meat packing has been an erratic activity, with plants in and out of operation. Continued expansion of the packing industry is dependent upon a steady year-round supply of fat cattle and the ability to market outside the State.

Most of the grain produced in Montana is exported from the State to the large U.S. milling centers or to overseas destinations. A small proportion is processed in Montana flour mills or animal feed plants. Like many other industries, the milling industry has become highly centralized. For the foreseeable future, little growth in Montana's milling employment seems likely.

Two beet sugar plants are currently in operation in Montana, one at Billings and another located at Sidney. Dairies, bakeries, and soft drink bottlers are scattered about the state serving the local population.

Given the industry's current composition, any expansion in food products is largely dependent upon growth in the Montana market. This growth is likely to be moderate. If the industry is to show substantial growth—enough to significantly affect employment and earnings—economic ways of marketing manufactured food products outside the State will have to be devised. Over the next few years, such developments are likely to be limited and food products employment and earnings probably will show little change.

### *Petroleum and Coal Products*

The petroleum and coal products industry in Montana consists of oil refining and is concentrated in Yellowstone County. Employment is small—averaging around 1,100 workers most years—but the jobs pay very well and the industry makes up an important part of Yellowstone County's economic base. Total wages and salaries paid to industry workers increased 14 percent between 1970 and 1977, after adjustment for price changes, although employment stayed the same.

From 40 to 45 percent of the oil refined in Montana comes from Canada. That country in the past has stated its intention of ending crude oil sales to the United States. In September 1978, however, the Canadian government announced that sales would be continued for three more years. This gives time for Montana to locate alternative sources of crude oil, presumably by pipeline from Alaska. Given the uncertain situation with respect to supply, prospects for any increase in employment over the next few years seem remote.

<sup>3</sup>Montana Department of Labor and Industry, Employment Security Division, unpublished data.

## *All Other Manufacturing*

Combined, the wood products, food products, primary metals, and petroleum and coal products industries provide almost three-fourths of total manufacturing employment in Montana and pay slightly more than three-fourths of the wages and salaries. The balance of manufacturing employment is in a number of other small industries: printing and publishing; paper products (referred to in the section on wood products); stone, clay and glass products (mostly cement and ready-mix concrete); fabricated metal products; chemicals; machinery; and various other industries. Combined they employed 6,300 workers in 1977, or about 12 percent more than in 1970. Printing and publishing activities employed about one-third (2,100) of the 6,300 workers and almost 1,200 were in stone, clay, and glass products, mostly at the two cement plants in the state or the numerous ready-mix concrete plants.<sup>4</sup> Generally speaking, this group of industries serves the local population, and probably will continue to expand quite slowly. However, there are several major out-of-state exporters in this group, namely the pulp and paper mill

at Missoula, referred to in the wood products section; an elemental phosphorous plant near Butte; and a farm machinery plant at Havre.

There is always the possibility of future expansions of existing industry or of new manufacturing export activities in the State. Because most new plants and expansions nowadays take considerable lead time for permits as well as construction, increases in employment and earnings can be anticipated well in advance. No such increases appear to be on the immediate horizon.

## *Conclusion*

What the preceding discussion appears to add up to is that manufacturing as a whole in 1979 and during the next few years will at best remain constant in terms of employment, and may decline. The decline would result from a decrease in wood products employment not compensated for by increases in other manufacturing industries.

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<sup>4</sup>Montana Department of Labor and Industry, Employment Security Division, unpublished data.



# MINING OF ENERGY RESOURCES: CRUDE PETROLEUM, NATURAL GAS, AND COAL

by

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The mining of energy resources is an important part of Montana's mining industry. The extraction of crude oil, natural gas, and coal has gained in importance since the OPEC oil embargo of 1973. Since that time, employment in energy-related mining has increased while jobs in other segments of Montana's mining industry generally have decreased. In 1977, the mining of energy resources accounted for about 57 percent of total mining employment.<sup>1</sup>

## *Crude Petroleum and Natural Gas<sup>2</sup>*

Crude petroleum and natural gas are extracted from 30 counties in the eastern two-thirds of Montana. In 1977, Montana wells produced 32.7 million barrels of crude oil and 48.2 billion cubic feet<sup>3</sup> of natural gas. Twenty fields produced crude petroleum and gas simultaneously. The gas from these fields, called associated gas, amounted to 3.7 billion cubic feet or 7.6 percent of the total gas produced.<sup>4</sup>

Currently, 25 Montana counties produce crude oil and 22 counties produce gas. The two top oil producing counties in 1977 were Fallon and Powder River, which together accounted for about half of the total production. Blaine and Hill counties were the top gas producers, accounting for 40 percent of the total gas extracted in 1977. Total crude petroleum and natural gas production by county is given below in Table 9.

Production of Montana crude oil has slowly but steadily declined from 37.9 million barrels in 1970 to 32.7 million barrels in 1977. The level of natural gas production has been somewhat erratic over the same period. Extracted gas totaled 37.4 billion cubic feet in 1970, climbed to 58.9 billion cubic feet (BCF) in 1973, dropped to 44.5 BCF in 1975, and rose to 48.2 BCF in 1977.<sup>5</sup>

The number of employees in the oil and gas sector of the mining industry has increased from approximately 1,800 in 1970 to about 2,600 in 1977.<sup>6</sup> Wage and salary

income derived from the extraction of oil and gas rose from \$14.3 million in 1970 to \$34.4 million in 1977.<sup>7</sup>

The steady increase in sector employment and income despite varying production levels is the result of new exploration, more intensive test drilling in the Williston Basin portion of eastern Montana, and the construction of new pipelines in the northeastern portion of the State. Little correlation exists between oil and gas output and the number of persons employed.

Montana's proven reserves on January 1, 1978, were 233 million barrels of crude oil and 1,093 billion cubic feet of natural gas. At current extraction rates, and assuming no new discoveries, crude oil reserves could be depleted in 7 to 10 years, and natural gas reserves could be depleted in 20 to 25 years. Offsetting factors discussed below will probably slow depletion rates, however.

The primary factors which determine the level of employment in crude petroleum extraction include federal crude oil pricing, federal and state leasing and environmental policies, and taxes. For gas, the primary determinant for employment is the new Natural Gas

<sup>1</sup>Montana Department of Labor and Industry, Employment Security Division, unpublished data.

<sup>2</sup>The author wishes to acknowledge the information contributed to this section by Don Allen, Executive Director of the Montana Petroleum Association, and by John Braunbeck, Fuel Allocation Officer, Energy Division, Montana Department of Natural Resources and Conservation.

<sup>3</sup>Measured at 14.72 p.s.i.

<sup>4</sup>Montana Department of Natural Resources and Conservation, Oil and Gas Conservation Division, *Annual Review for the Year 1977*.

<sup>5</sup>Montana Energy Office, *Montana Historical Energy Statistics*, February 1977.

<sup>6</sup>Montana Department of Labor and Industry, Employment Security Division, unpublished data.

<sup>7</sup>U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System.

**Table 9**  
**MONTANA CRUDE PETROLEUM AND NATURAL GAS PRODUCTION**  
**1977**

| County        | Crude Oil<br>(barrels) | Natural Gas<br>(million cubic feet) |
|---------------|------------------------|-------------------------------------|
| Big Horn      | 79,996                 | 32,329                              |
| Blaine        | 182,254                | 11,279,102                          |
| Carbon        | 1,101,700              | 1,066,713                           |
| Carter        | 11,045                 | 0                                   |
| Chouteau      | 0                      | 1,349,169                           |
| Custer        | 0                      | 479,794                             |
| Dawson        | 990,919                | 95,732                              |
| Fallon        | 6,533,654              | 2,367,008                           |
| Garfield      | 52,290                 | 0                                   |
| Glacier       | 1,355,945              | 3,857,845                           |
| Golden Valley | 271                    | 698,621                             |
| Hill          | 0                      | 7,229,456                           |
| Liberty       | 323,260                | 3,775,503                           |
| McCone        | 294,903                | 0                                   |
| Musselshell   | 1,181,503              | 0                                   |
| Petroleum     | 52,290                 | 0                                   |
| Phillips      | 0                      | 3,081,533                           |
| Pondera       | 150,907                | 81,206                              |
| Powder River  | 9,110,037              | 383,159                             |
| Prairie       | 542,448                | 93,830                              |
| Richland      | 2,684,248              | 1,440,566                           |
| Roosevelt     | 1,293,948              | 512,052                             |
| Rosebud       | 2,378,959              | 266,213                             |
| Sheridan      | 1,722,102              | 0                                   |
| Stillwater    | 7,620                  | 1,386,827                           |
| Teton         | 146,245                | 0                                   |
| Toole         | 1,902,345              | 4,647,471                           |
| Valley        | 0                      | 3,016,977                           |
| Wibaux        | 548,371                | 93,835                              |
| Yellowstone   | 32,794                 | 0                                   |
| <b>TOTAL</b>  | <b>32,680,054</b>      | <b>47,234,941</b>                   |

SOURCE: Montana Department of Natural Resources and Conservation, Oil and Gas Conservation Division,  
*Annual Review for the Year 1977.*

Policy Act recently passed by Congress. Other factors are taxes, leasing, and environmental policies.

Although the prospects of significantly increasing the levels of oil and gas production are not high, the outlook for increased employment is favorable. Drillers in the Montana portion of the Williston Basin are having extraordinary success in deeper exploratory and development drilling. The potential of the Overthrust Belt, a portion of the Rocky Mountains which ranges through western Montana, has caused accelerated bidding at State land sales. Utah, Wyoming, and Canada have experienced success in oil and gas discovery in the Overthrust Belt, hence the strong interest in the area by Montana developers.

The experimental tertiary recovery of crude oil in the Bell Creek Field in Powder River County has also been highly successful. By employing a process called mycellar-polymer flooding, the Bell Creek Field produced over 9 million barrels of crude oil in 1977—the

highest production of any field that year. The new strikes and improved technology may maintain current production levels of oil and gas for a few more years.

Employment in the oil and gas sector should climb to slightly over 3,000 workers in 1978 because of the activities mentioned above. As exploration for new fields increases and drilling accelerates, and if secondary and tertiary recovery of oil are more actively pursued, employment will probably continue to increase through 1980, possibly reaching the 3,500 to 4,000 worker range.

The picture for 1985 is not clear as far as employment is concerned. Oil and gas wells will be gradually drying up. Unless oil prices reach a level to make secondary and tertiary recovery economically feasible, production from current wells will decrease substantially. The potential for new finds in the Overthrust Belt and other areas still exists, however. This potential will probably keep workers out in the field exploring for new strikes. Also, the effects of the Natural Gas Policy Act cannot be

predicted with any certainty, and the amount of public land in Montana that will be available for exploration is still being discussed. Public attitudes toward further development will play an important role in the future of oil and gas extraction.

## Coal

Coal mining in Montana consists primarily of surface mining of low-sulfur sub-bituminous coal and a small amount of lignite. About 90 percent of all sub-bituminous coal produced each year in Montana is shipped east by rail to coal-fired electric generating plants in the Midwest. Lignite, which is mined by the Knife River Coal Company at Savage, is burned at the electric generating plant owned by Montana-Dakota Utilities Company in Sidney. The generating facilities at Colstrip (Units 1 and 2) burn in the neighborhood of 2.2 million tons of sub-bituminous coal annually.

Virtually all coal mining currently takes place in five counties. The Decker and Westmoreland mines are located in Big Horn County; the Western Energy and Peabody mines at Colstrip are located in Rosebud County; the Knife River mine at Savage is located in Richland County; the Divide and PM mines at Roundup are located in Musselshell County; and the Coal Creek mine at Ashland is located in Powder River County. As shown in Table 10, Big Horn and Rosebud counties accounted for approximately 99 percent of the total 1977 coal production in Montana.

Coal production increased from 3.5 million tons in 1970 to 27.4 million tons in 1977.<sup>8</sup> Correspondingly, employment in Montana's coal mining industry ranged from 128 employees in 1970 to 866 employees in 1977.<sup>9</sup> In addition, wage and salary income derived from coal mining totaled \$1,003,000 in 1970 compared with \$19,223,000 in 1977.<sup>10</sup>

Montana has total identified resources of 176.8 billion tons of sub-bituminous coal and 112.5 billion tons of lignite which comprise 36 percent and 24 percent, re-

spectively, of the United States total. Additional identified resources of 2.3 billion tons of bituminous coal also exist in the State, although none of these deposits are currently being mined.<sup>11</sup> Most future mining in Montana will continue in the Powder River Basin area of southeastern Montana.

Demand for low-sulfur western coal by midwestern utilities is the prime determinant of the growth of coal production in Montana. Since the 1973 Arab oil embargo, this demand has been great and will become even greater. Among the factors that may constrain the rapid growth in demand are the regulations of the United States Environmental Protection Agency (EPA). If the EPA further tightens its emission standards so as to require scrubbers, the demand could shift to eastern coal.

According to various forecasts, Montana's coal output will continue to increase in the future with rather sharp increases occurring from 1980 forward. This will mean extra employment and personal income in the Montana coal mining sector, but potentially adverse social, economic, and environmental impacts as well.

Coal production in 1978 probably will be about the same or slightly less than the 27.4 million tons in 1977. Heavy snows early in the year buried railroad trains in the Dakotas for several days and held back coal shipments. Railroad cars have been continually difficult to obtain during 1978, and the shortage of cars has held

<sup>8</sup>Montana Department of Natural Resources, Energy Division, unpublished data; and Montana State Board of Equalization, *Twenty-fifth Biennial Report* (July 1, 1970 to June 30, 1972).

<sup>9</sup>Montana Department of Labor and Industry, Employment Security Division, unpublished data.

<sup>10</sup>U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System.

<sup>11</sup>U.S. Department of the Interior, Geological Survey, *Coal Resources of the United States*, January 1, 1974, Bulletin 1412, 1975. Figures are for resources in the ground, about half of which may be considered recoverable. These include beds of bituminous coal 14 inches or more thick, and beds of sub-bituminous coal and lignite 30 inches or more in thickness.

**Table 10**  
**MONTANA COAL PRODUCTION**  
**1977**

| County       | Production<br>(Tons) | Percent of Total |
|--------------|----------------------|------------------|
| Big Horn     | 14,919,477           | 54.50            |
| Rosebud      | 12,139,795           | 44.30            |
| Richland     | 302,426              | 1.10             |
| Musselshell  | 15,727               | 0.05             |
| Powder River | 16,014               | 0.05             |
| TOTAL        | 27,393,439           | 100.00           |

SOURCE: Montana Department of Natural Resources and Conservation, Energy Division, unpublished data.

back production through the first three quarters of the year. The Decker mine had planned to boost its production in 1978 by about 5 million tons. Because of the rail car shortage, however, this increase probably will not occur.

Although coal production in 1978 probably will not increase, preliminary information indicates that average employment will increase to about 1200 persons for the year. Correspondingly, wage and salary income will also be higher than the 1977 level. This non-production related employment increase is apparently being caused by the construction of mining facilities by companies that also mine the coal. An example of this is the construction of a new dragline at the Westmoreland mine.

Mining output of sub-bituminous coal in 1979 should be up from 1978. The Burlington Northern Railroad is trying to alleviate the railroad car shortage problem by January, 1979. In all probability, no new mines will be in operation in 1979, but production from existing mines could reach 30 million tons or higher. Employment will probably be near the 1978 level through most of 1979.

The year 1980 could see significant increases in coal production. Four new mines and some expansions of existing mines are now awaiting approval and could become operational by that time. The proposed Western Energy Mine expansion will maintain current production levels and possibly increase output slightly. The expansion proposed by the Peabody Coal Company will allow production to continue at current rates. As mentioned above, Westmoreland Resources is currently building a new dragline which will double the capacity

of its mine to about 10 million tons per year. The Beartooth Coal Company in Red Lodge is proposing a new underground mine that could be operating in 1980. The capacity of the Beartooth Mine is uncertain at this time but will probably be less than one million tons per year. The Decker North Mine in Big Horn County could be on line with 2.5 million tons per year of additional capacity by 1980. Another new mine proposed by Shell Oil Company in Big Horn County will also be capable of producing about 2.5 million tons of sub-bituminous coal each year. A small 10,000 ton capacity mine in Blaine County, called Warburton, could also be operating by 1980. Production from the new mines and from mine expansions, if approved, will probably not gain full steam in 1980. Output could, however, increase several million tons over 1979. Employment would increase correspondingly as a result.

By 1985, the permitting process should be complete on: the Circle West Mine in McCone County, the 10,000 ton per year Hathaway Mine in Custer County, the Nerco Mine with a 7 million ton per year capacity in Big Horn County, the Montco Mine which is expected to produce 1 million tons in 1983 and 9 million tons by 1985, the AMAX Mine which may produce as much as 10 million tons per year, and the Consolidation Mine which could be producing 3 million tons per year by 1985. If these new mine permits are approved, it will mean a potential increase of more than 20 million tons per year in sub-bituminous coal production over the 1980 level. As a result, employment in the coal industry could easily reach the 2,000 to 2,500 range in Montana by 1985.

# METAL MINING

by  
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Montana is well endowed with metallic minerals. Current production consists of copper, silver, gold, antimony, zinc, lead, and tungsten. Large deposits of other metals also exist in the State.

Metal mining in Montana is concentrated in the mountainous regions of the western, central, and south-central parts of the State. Those counties that are contributing to present metal production and hold future reserves are Silver Bow, Beaverhead, Jefferson, Madison, Granite, Mineral, Sanders, Lincoln, Flathead, Ravalli, Lewis and Clark, Broadwater, Fergus, Meagher, Cascade, Carbon, Stillwater, Park, Judith Basin, and Phillips.

## *Employment and Earnings*

In 1977, the Montana metal mining sector employed an average of 2,000 workers. This represented a reduction of 2,000 employees from the 1974 level, primarily in the copper industry.<sup>1</sup> This, in turn, was attributed to depressed copper prices, which were the principal cause of the closure of underground mining operations in the Butte mining district; curtailed open-pit production and closure of leaching and precipitation operations at Butte; and the shutting down of the Arbiter Plant at Anaconda. Curtailed production of copper resulted in the reduced employment in metal mining mentioned above, as well as loss of wages and salaries, which in 1977 were only equal to the 1970 level<sup>2</sup> (despite large wage increases for employees during this eight-year period).

## *Resources and Reserves*

Montana's resources (mineral commodities that have no present market because of price or uniqueness) and ore reserves (mineral commodities that can be mined at a profit) are of great importance to future metal production in the State. Montana has large reserves and resources of metallic minerals, which in addition to those presently mined include manganese, nickel, chromium, titanium, vanadium, molybdenum, arsenic, iron, uranium, thorium, and rare earth minerals.

Copper, silver, nickel, and molybdenum reserves and resources have been explored in a number of Montana counties, namely Lincoln, Lewis and Clark, Flathead, Carbon, Silver Bow, Mineral, and Cascade. Large manganese resources are present in both Silver Bow and Granite counties. Gold resources and reserves are being explored in Jefferson, Park, and Phillips counties. Gold, tungsten, and arsenic resources are present in southern Park County and in the East Pioneer and Flint Creek ranges of Beaverhead, Deer Lodge, and Granite counties. Iron and platinum resources are of significance in the Stillwater Complex (Stillwater, Sweet Grass, and Carbon counties); the Butte area in Silver Bow County has large reserves of zinc and some lead. Considerable reserves of titaniferous iron occur in a belt parallel to the Rocky Mountain Front (Teton, Pondera, and Glacier counties). Thorium resources in western Beaverhead County may prove to be of future economic significance. Vanadium and uranium are present in recoverable quantities in the Permian phosphate beds of western Montana and may be recovered as a by-product in future phosphate mining and processing.

## *Copper*

Silver Bow County is the leading producer of copper in Montana with about 99 percent of the metal produced in the Butte district. Copper production from 23 mines during 1976 amounted to 91,500 short tons, an increase of 4 percent from 1975.<sup>3</sup> The value of production was \$127 million in 1976, an increase of 12 percent over 1975.<sup>4</sup> During 1977, copper production decreased to 86,000 short tons, with the value of

<sup>1</sup>Montana Department of Labor and Industry, Employment Security Division, unpublished data.

<sup>2</sup>U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System.

<sup>3</sup>U.S. Department of the Interior, Bureau of Mines, and Montana Bureau of Mines and Geology, *Minerals in the Economy of Montana*, SMP-6, May 1978.

<sup>4</sup>*Ibid.*

production dropping to \$115 million, a decrease of 9 percent from the previous year.<sup>5</sup> Also during 1977, the average price for cathode copper was 66.2 cents a pound, a 3-cent reduction from 1976. Falling copper prices and reduced production of copper accounted for the decrease in value.

During the first 7 months of 1978, copper prices fluctuated around 63 cents a pound, and producers described the copper industry as being in the worst depression in 40 years.<sup>6</sup> Stockpile accumulations and competition from foreign copper producers (excess production) caused the depressed condition of the copper industry in Montana and throughout the western United States. Since August 1978, however, copper prices have increased to some extent.

### *Other Metals*

During 1978, precious metals were in demand, and prices increased as a result of continued and probable accelerating inflation. In July 1978, gold prices soared above \$200 per ounce. The average silver price during July was \$5.33/oz., about 75 cents an ounce higher than the average 1977 price.

Other Montana metallic minerals experienced price increases during 1978. These included lead, tungsten, antimony, chromium, and uranium. Lead increased from an average of 30.7 cents a pound in 1977 to 35 cents a pound in September 1978. During 1978, antimony metal was quoted at \$1.75 a pound, tungsten was \$120 per unit (20 pounds), and uranium sold for about \$45 a pound on the open market. Production of these minerals also increased over 1977 levels as a result of the price increases.

### *Outlook for Metals*

The short-term outlook for copper production is not encouraging unless surplus stocks are consumed and new on-stream capacity operates at reduced levels. This is not likely to occur in the immediate future. For the short-term, copper and associated precious metals production from copper mining are expected to continue at about the same level or even at a slightly reduced level, with employment and earnings changing correspondingly. The production of other metals may increase during this same time period, causing total metal production, employment, and earnings to increase.

For the longer term, copper prices are expected to increase to the 80 cents to 1 dollar-per-pound range, and prices of other metals will continue to show an upward trend, reflecting both continued inflation and increased metal demand. Therefore, the long-term outlook for production, employment, and earnings for Montana's metal mines is upward. There are, however, some retarding factors.

The factors that will have an adverse impact on Montana's future capability to produce metals include significant additions of federal land to the Wilderness System, which will limit mineral exploration and development; inception of Rare II policies and regulations that will add "instant wilderness" without a thorough study of mineral potential of withdrawn lands; and federal law and departmental regulations pertaining to development and production of mineral commodities.

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<sup>5</sup>U.S. Department of the Interior, "The Mineral Industry of Montana," *Bureau of Mines Minerals Yearbook, 1977* (preprint).

<sup>6</sup>*Engineering and Mining Journal*, August 1978.

# MINING OF NONMETALLIC MINERALS, EXCEPT FUELS

by

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There are a number of important nonmetallic minerals other than fuels being mined in Montana. These include sand, gravel, and crushed rock; vermiculite, bentonite, talc, gypsum, limestone, and phosphate rock. After a brief analysis of historical employment and earnings data for the industry as a whole, several of the major commodities will be discussed below in some detail. The minerals discussed are: sand, gravel, and crushed rock; vermiculite; and bentonite.

## *Employment and Earnings*

Since 1960, employment in the mining and quarrying of nonmetallic minerals (excluding fuels) has fluctuated between 600 and 1,100.<sup>1</sup> The peak of 1,100 employed persons was in 1965-1966 and the low of 600 was in 1976 and 1977.<sup>2</sup> Wage and salary disbursements (not adjusted for inflation) in this industry have increased in recent years in spite of the downward employment trend since 1966, indicating increasing per worker earnings.<sup>3</sup>

## *Sand, Gravel, and Crushed Rock*

Sand, gravel, and crushed rock are dug or quarried for concrete products and for road surfacing in most counties in Montana. Rock is quarried intermittently for concrete aggregate and other uses at many localities in the State as local demand requires. There are many deposits of these materials in the western part of the State, so these commodities are quarried as close to the market as practical. In some parts of eastern Montana sand, gravel, and crushed rock are not locally available and must be hauled considerable distances. The estimated 1977 Montana production of sand and gravel was 5,000,000 tons with a value of \$7,800,000.<sup>4</sup>

The demand for sand and gravel and crushed rock for road surfacing is not likely to change significantly

through 1985. Much sand and gravel or rock for this use is dug by the county or state highway departments. The materials that are used in construction are, of course, dependent on local construction activity. Around those cities that are growing rapidly, the production of sand and gravel or crushed rock will continue at the present rate or will increase. In the past, interstate highway construction created a large demand for sand and gravel and crushed rock. Because this program is close to completion, sand and gravel production for highway construction is not expected to increase. If a large construction project such as a dam were started, however, there would be a heavy local demand for sand and gravel or crushed rock.

## *Vermiculite*

Production from one of the world's major vermiculite deposits near Libby (Lincoln County) was started shortly after World War I and has continued since then. A smaller vermiculite mine is being started in Ravalli County in 1978. In recent years the vermiculite market has been unusually good because of the demand for exfoliated vermiculite for insulation. Vermiculite is also used in some building materials and as a soil conditioner in horticultural applications. Figures on the quantity and value of vermiculite produced in Montana are withheld to avoid disclosing individual firm characteristics.

<sup>1</sup>Montana Department of Labor and Industry, Employment Security Division, unpublished data.

<sup>2</sup>*Ibid.*

<sup>3</sup>U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System.

<sup>4</sup>U.S. Department of Interior, Bureau of Mines, and Montana Bureau of Mines and Geology, *Minerals in the Economy of Montana*, SMP-6, May 1978.

The continued strong demand for vermiculite in insulation applications will probably lead to an increase in employment and production in 1979 and to continued steady growth in vermiculite production over the long term. It is thought that the ore body at the Libby deposit is of sufficient size to sustain mining for many years. The deposit at Libby and the one in Ravalli County are in the same type of rock, which leads one to speculate that there may be similar vermiculite deposits in western Montana hidden beneath soil and timber cover. Given the present market for vermiculite, a newly discovered deposit would probably be rapidly developed and put into production.

### *Bentonite*

There are bentonite deposits in Carter, Big Horn, Carbon, Yellowstone, Treasure, Judith Basin, Fergus, Petroleum, Blaine, Phillips, and Valley counties. Bentonite has been mined for years from deposits in Carter County close to the Wyoming border. This bentonite is hauled to a nearby Wyoming plant for processing. In the late 1960s and early 1970s, bentonite was mined northwest of Forsyth in Treasure and Rosebud counties. In 1978, construction is underway on two bentonite processing plants, one near Glasgow (Valley County)

and the other near Malta (Phillips County). These plants will dry and pulverize bentonite that will be strip mined in these areas and will have a combined capacity of 550,000 tons per year when they are completed in 1979. The estimated 1977 production of bentonite from existing mines was 219,000 tons.<sup>5</sup> No value is available for this production. However, the price of crude bentonite is probably in the range between \$8 and \$15 per ton.

Future earnings and employment in the Montana bentonite industry will depend mainly on the market. Montana has many large deposits of bentonite that have not been mined because deposits in Wyoming and South Dakota were of better quality. Now, because of an improved market and the depletion of some of the most easily mined deposits in these neighboring states, producers have become more interested in mining Montana deposits. Obviously, the start of two new mines within the next year will increase Montana bentonite production substantially in 1979. The longer-term increase in Montana bentonite production, although not as dramatic as the short-term increase, may still be appreciable. This growth in production will depend on two main markets, the iron ore industry, which uses bentonite as a binder in pelletizing iron ore concentrate obtained from taconite ore, and the oil and gas drilling industry. The latter industry uses bentonite as drilling mud.

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<sup>5</sup>U.S. Department of Interior, Bureau of Mines, and Montana Bureau of Mines and Geology, *Minerals in the Economy of Montana*, SMP-6, May 1978.



